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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/522,781 | 01/28/2005 | Lee D Miller | 540-546 | 1674 |
| 23117 | 7590 | 05/02/2006 | EXAMINER | |
| NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203 | | | STEIN, JAMES D | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2874 | |

DATE MAILED: 05/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/522,781

Applicant(s)

MILLER ET AL.

Examiner

James D. Stein

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01/28/05 (pre-amendment).
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 15-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 15-18 and 20-26 is/are rejected.
- 7) ☒ Claim(s) 19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 January 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 0105, 0805.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

This Office Action is responsive to the preliminary amendment filed on 1/28/05, which has been fully considered and entered. Claims 1-14 have been cancelled and new claims 15-26 have been added.

Information Disclosure Statement

The documents submitted in the IDS filed on 01/28/05 and 08/25/05 have been considered (note attached copies of PTO-1449 forms)

Drawings

Three (3) sheets of drawings submitted on 01/28/05 have been accepted.

Specification

Applicant's cooperation is requested in correcting any errors in the specification of which applicant may become aware.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 15-16 are rejected under 35 U.S.C. 102(b) as being anticipated by JP402251804 to Sotodani et al., which discloses a similar optical fiber coupling arrangement.

With regard to claim 15, figs. 1 and 2 of Sotodani shows an optical fiber having a core 4c of which a first longitudinal portion is of generally constant cross-sectional area and is covered by an inwardly facing reflective coating 4d (metallic coating) to cause electromagnetic radiation

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to travel along the first portion of the core 4c by means of internal reflection, and a second longitudinal portion is covered by a cladding 4a/4b having a refractive index suitable for guiding the electromagnetic radiation along the second portion of the core 4c, and wherein the cross sectional area of the first portion of the core and its associated coating 4d is less than the cross sectional area of the second portion of the core and its associated cladding 4a/4b. It is noted that in order for light to be guided within the core 4c of an optical fiber, the refractive index must *inherently* be suitable for guiding light along the core (i.e. less than that of the core 4c).

With regard to claim 16, in addition to the rejection of claim 15 previously discussed above, figs. 1 and 2 show that an intermediate longitudinal portion of the core 4c between said first and second portions, an end of the cladding material 4a/4b terminates in the intermediate portion, and a part of the exterior of the cladding material 4a/4b of the intermediate portion is covered by said inwardly facing reflective (metallic) coating 4d.

Claims 15, 17, 18, 20, 25-26 are rejected under 35 U.S.C. 102(b) as being anticipated by JP405157949 to Uda et al. ("Uda").

With regard to claims 15, 17, 18, 20, at least figs. 3, 4 and 6 show an optical fiber having a core 2 of which a first longitudinal portion (fig. 6, right side) is of generally constant cross-sectional area and is covered by an inwardly facing reflective coating 3 (metallic coating) to cause electromagnetic radiation to travel along the first portion of the core 2 by means of internal reflection, and a second longitudinal portion (fig. 6, left side) is covered by a cladding 5 having a refractive index suitable for guiding the electromagnetic radiation along the second portion of the core 2, and wherein the cross sectional area of the first portion of the core 2 and its associated coating 3 is less than the cross sectional area of the second portion of the core 2 and its

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associated cladding 5. It is noted that in order for light to be guided within the core 2 of an optical fiber, the refractive index must *inherently* be suitable for guiding light along the core (i.e. less than that of the core 2). Furthermore, the end of cladding material 5 is tapered 6, the thinnest part of the taper 6 is directed towards the first portion (fig. 6, right side) of the core 2.

With regard to claims 25-26, at least figs. 3,4 and 6 show a fiber optic arrangement for coupling a light pipe (fig. 6, right side) to a clad fibre (fig. 6, left side) comprising an optical fibre core 2 having a reflective (metallic) coating 3 and a clad optical fibre (2, 5) comprising an optical fibre core 2 with cladding 5 surrounding the core 2, the optical fibre core of the light pipe being optically joined to the core of the clad optical fibre such that electromagnetic radiation is able to travel from the light pipe to the clad fibre, wherein tapered cladding 6 is provided in the region where the light pip is optically joined to the clad optical fiber. It is noted that although said light pipe and optical fibre share a core, a first portion of it is associated with the light pipe, while a second portion is associated with the fibre. This is all that is required by the claim, as it only limits the core of the light pipe to be *optically* joined with the core of the optical fiber. It does not require that said cores are two distinct or separate elements. The figures also show that the tapered cladding material 6 is partially covered by said reflective (metallic) coating 3.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Uda. In addition to the rejections of claim 15 previously discussed above, the claimed invention has been disclosed except for the first portion of the core to have a different cross section than the second portion of the core. It would have been obvious at the time of the invention to vary the sizes of said first and second portions of the core relative to one another in order to maximize the amount of light coupled into the optical fiber. It has been held that a mere change in size in order to achieve optimum or working ranges is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955); *In re Boesh*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sotodani or Uda as applied to claim 15 above, and further in view of [USPAT 5,640,017] to Thevenin, which discloses a related coupling device. The claimed invention has been disclosed and previously discussed above except for the first and second longitudinal portions of the core formed from different materials. Fig. 1 of Thevenin shows a similar light pipe arrangement wherein the first portion of the core 6 is a fibre core and the second portion of the core 10 is crystal (see col. 6). Thevenin teaches that this arrangement increases the coupling efficiency of the device. Therefore, it would have been obvious at the time of the invention to an ordinarily skilled artisan to form the first and second core portions from different materials in order to increase the coupling efficiency of the device.

Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sotodani or Uda as applied to claim 15 above, and further in view of JP405157917 to Ito et al. ("Ito"), which discloses a similar optical fiber arrangement. The claimed invention has been

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disclosed and previously discussed above except for a plurality of such fibers to be arranged such that the first portions are side-by-side (i.e. an optical fiber array). Optical fiber arrays are well-known in the art to be useful for accommodating a plurality of optical signals simultaneously. Figs. 1-3 of Ito show similar fibers 5 with metallic coatings 3 arranged in an array. It would have been obvious at the time of the invention to one of ordinary skill in the art to modify Sotodani such that a plurality of such fibers were arranged in an array in order to accommodate many optical signal simultaneously. Furthermore, it has been held that a mere duplication of essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

Allowable Subject Matter

Claim 19 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form *including all of the limitations of the base claim and any intervening claims*. None of the cited prior art discloses or suggests the optical device previously claimed wherein the reflective coating is thickest at the thinnest part of the taper. The claimed invention as a whole provides for improved coupling efficiency over the prior art.

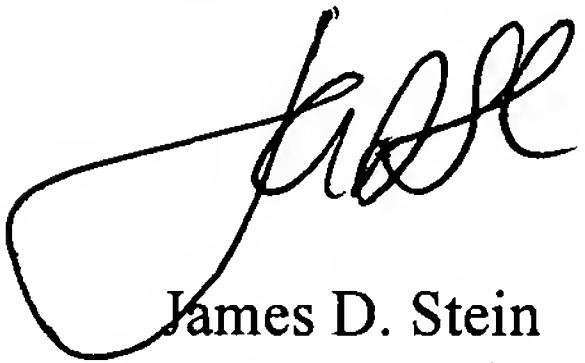
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James D. Stein whose telephone number is (571) 272-2132. The examiner can normally be reached on M-F (8:00am-4:30pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



James D. Stein
Patent Examiner, AU 2874



MICHELLE CONNELLY-CUSHWA
PRIMARY EXAMINER